

Chapter 3. Technology and Technical Support

INTRODUCTION

In this chapter, we move from a discussion of the functional requirements to a detailed description of the recommended architecture within which electronic commerce (EC) will be conducted. This architecture represents an integrated communication and computing infrastructure composed of standard support services and facilities based on standards and principles of open systems.

The architecture is composed of the following fundamental components:

- A single means of registration to do business electronically with the Federal government, including a standard trading partner agreement (TPA) defining the trading process and transaction sets that will be used.
- A single, consistent methodology and syntax for expressing and conveying business data in electronic data interchange (EDI) transactions, i.e., ASC X12 transaction sets.
- A virtual network linking agency standard transactions to facilities where value-added networks (VANs) or other entities can access and distribute them via a technical infrastructure.
- A standard agreement between the Federal government and VANs that provides certain technical support to the government and its trading partners.

Although discussed individually, all components must be integrated in an effective fashion to meet our primary objective of providing a single framework within the Federal government to procure supplies and services.

TRADING PARTNER REGISTRATION

A trading partner is an organization—vendor or supplier—that uses EDI to conduct business. To do so, it must first register as a trading partner and must acknowledge a TPA. A TPA facilitates the creation of a future procurement. Both industry and government use TPAs to define general EDI procedural and technical terms and conditions, and transaction sets that will be used. Some TPAs are incorporated within a contract as special provisions. Currently, agencies and individual procurement offices maintain their own vendor registration files and are developing their own TPAs. However, as the government moves toward EC, registration of trading partners must be centralized, and a standard electronic agreement format must be developed to enable the government to present a “single face to industry.”

The government collects vendor registration information as a prelude to doing business. Every procurement office collects vendor information. A vendor must complete a Standard Form 129, Solicitation Mailing List Application, to register. The vendor's application provides a detailed description of the business, the commodities or services it wants to sell to the government, and the authorized agents who can contractually bind the business.

The Small Business Administration maintains an automated file on small businesses called the Procurement Automated Source System (PASS). This file contains information similar to the SF-129. It also contains specific information on minority vendor ethnicity.

The Defense Logistics Agency (DLA) collects vendor information for its supply management system. Although this information is limited, it assists DoD in maintaining an active list of supply sources for its worldwide supply programs.

Not only does the Federal government collect vendor registration information many times, it also collects supplemental business information many times. Representations and certifications are sent with each written quote, bid, or proposal. After award, other business information is collected such as bank and account number information for electronic funds transfer. Under EC, the government can simplify the process and let businesses certify during registration, and update if there are any changes, annually certify their compliance with the representations and certifications. Some registration information is dynamic and must be updated as it changes. Other information changes infrequently. Some information, however, must be provided with each bid or proposal under current law.

When multiplied by all procurement transactions and every Federal procurement office, the same information is being provided many times for the same purpose. It is not effective to repeatedly collect the same information from the same source and for the same purpose when we have the means to collect the information once and distribute it to those needing it. It is far easier for a business to maintain its single repository of registration information than to submit the same information each time it submits a bid, quotation, or proposal. EDI can simplify the exchange of information during a procurement by collecting commonly used information electronically during registration. By collecting this information once, future EDI communications can focus on procurement issues.

Commercial VAN service bureaus will support a government-wide EC registration process. Other sources providing information on registration are the Small Business Administration, state and local governments, chambers of commerce, libraries, universities, colleges, and Federal agencies.

Here is an example of a procurement process change made possible by EDI. Each business responding to a written quotation or solicitation must now certify whether or not it is a small business. The size of a business is determined by either the average number of employees or the 3-year average of annual gross receipts, depending on the Standard Industrial Classification (SIC) code used. Business size can vary with the SIC code. Rather than requiring a trading partner to certify its business size status with each acquisition, computers can analyze basic business information provided at registration (e.g., number of employees or gross receipt) to determine their size by SIC. Registration information that is dynamic should be updated by the trading partner as it changes, either as it happens or during a predetermined cycle.

Characteristic benefits of EDI trading partner registration are that it standardizes the registration procedure across the Federal government, eliminates redundancy, provides a common method of gathering trading partner information, and supports the “single face to industry” concept.

Although this process concentrates on a commerce capability, the establishment of a nationwide EC registration process can assist future EDI initiatives. Once the process is enabled, each successive EDI application can use this existing component as a baseline and potentially accelerate deployment of a new application.

EC technology presents a more effective way of gathering and disseminating trading partner information from the perspective of both the trading partner and the Federal government:

- The trading partner wants to submit one application and reach all Federal procurement offices; know that its application is properly completed and received; and ensure that when performance history information is collected, it is correct.
- The Federal procurement community wants information that is useful and accurate, the same information in the same format from every trading partner, and positive identification of the trading partner so that performance history can be tracked.

These statements require a registration process that can accurately identify each firm with the following four components:

- The trading partner submits one application for each business entity that wants to do business with the government.
- The application is correct and receipt acknowledged.
- The information is made available to all procurement offices.
- TP performance information is correct.

Non-EDI vendors can also register. The Federal government is aiming for 100 percent participation of all vendors in EDI registration. Benefits to the government of

registering vendors that are not EDI capable, include less overall cost, more accurate information, electronic payment, increased accuracy of past performance information, and a more complete central vendor registration data base. Non-EDI-capable vendors benefit through a larger market place for goods and services, electronic receipt of payments, and a one-time registration. VAN service bureaus can provide this service for a nominal cost to the vendor. Standard non-EDI registration software can be developed by the government for use at Agency procurement offices and other government sites.

INFORMATION REQUIREMENTS

Presently, if a trading partner desires to provide supplies or services to any agency within the government it must contact that agency directly. Therefore, a trading partner must contact many procurement offices if it wants to conduct business with many agencies. One way to simplify the process is to register all potential trading partners in one data base.

Electronic trading partner registration must accommodate the needs of various interested parties within and outside the government. Interested parties most likely include the trading partner, agency procurement and accounting offices, VANs, and any party that would be interested in the information collected. Other interested parties, such as subcontractors, government agencies, for-profit and nonprofit companies or academies, might be interested in the data base for grants, cooperative agreements, debt collection, loans, and research. Appendix A provides a comprehensive list of information requirements; Appendix B indicates the potential users of the information.

With these interested parties in mind, the following sources of information were analyzed:

- X12 838 Trading Partner Profile (registration) transaction set
- IRS Form SS-4, Application for Employer Identification Number
- Standard Form 129, Solicitation Mailing List Application
- Small Business Administration Form 1167, Procurement Automated Source System (PASS) Company Profile
- Dun and Bradstreet's DUNS[®]
- Treasury's Vendor Express application forms.

Some EC information requirements were not available through these sources. A comparison is presented in Appendix C.

Each item was analyzed for need and availability. Business name, address, telephone number, and facsimile number are obvious requirements for trading partner

registration. In addition, to facilitate administrative processes, the names of the trading partner's administrative contact person and person authorized to sign offers and contracts are needed. Information such as the type of business, size of the firm, and size classification are used by procurement personnel. For a finance office to process and for the trading partner to receive payments electronically, the following information is needed: the name, address, telephone number, and American Bank Association number of the trading partner's financial institution; the trading partner's bank account number and type; and any remittance information. If the trading partner uses a VAN, the VAN's name, address, and identification number are also required.

Registration information may be requested by third parties. While some data elements are public information, others have financial or commercial value to a vendor and cannot be released. Other data elements can be released provided the data are not associated with a specific name or location, as discussed in Appendix C.

Not every trading partner profile is needed by every procurement office. Some larger DoD and civilian procurement offices will use a larger active trading partner pool, but most procurement offices will use fewer than several hundred active trading partners. During registration, two key questions are asked to help identify those procurement offices with which the trading partner most likely will do business:

- In what geographic areas of the country does the trading partner want to do business?
- What SIC codes, Federal Supply Classes (FSCs), national stock numbers (NSNs), or other methods describe the trading partner's business?

Prior to the trading partner information being provided by the central registration site, each agency must survey its procurement offices to determine categories of commodities or services that it buys. This information will be furnished to the central registration site. The procurement office will be provided only those trading partner profiles matching the commodities and services it buys. A procurement office can request a specific trading partner or adjust its buying commodity or service profile to alter the names in its trading partner file.

When registration information is received, all data elements will be reviewed for completeness and accuracy. Trading partners can change registration information by submitting a trading partner profile change. The registration data base must be validated annually to ensure trading partners are still in business and have kept information current.

IDENTIFICATION NUMBERS

The government will require a company identification code (CIC) to identify vendors who register as government trading partners. The CIC will support the EC

process by providing a means to identify trading partners in EC transaction sets (used in the ISA and GS segments and elsewhere) and by differentiating between trading partners who maintain different operations at the same geographic location.

The DoD December 1993 *EC/EDI in Contracting* report made two recommendations about trading partner identification that must be used in a Federal EC system. The first suggests transmitting the trading partner's name and address via code rather than full text. The advantage here is reduced transmission overhead costs since the code is much smaller. The report further states that this issue was identified as a potential business process improvement at the Procurement Corporate Information Management Council's Functional Requirements Managers Electronic Commerce Conference in February 1993.

Second, DoD would designate a primary trading partner identification code for all procurement automated information systems (AISs) with EDI capability and include cross-references to other required codes. This recommendation recognizes that the existence of multiple identification codes requires numerous cross-reference files and creates inefficiencies in contract data bases.

Without a CIC, a computer can differentiate between trading partners, for example, only by comparing names and addresses—possibly a comparison of over 300 characters and numbers. An accurate comparison requires coding standards for users since a computer will find that “3^d St.” and “Third Street” are different. A CIC eliminates this ambiguity by virtue of its uniqueness. There can be no mistake that CIC “ABC12345” represents the XYZ company at Suite 100, 123 Main Street. A CIC's shorter length improves the speed of locating computer records and reduces transmission overhead by eliminating the need to transmit names and addresses in full text.

The government CIC should follow accepted industry practice to maintain a “single face to industry.” CIC's must be widely known and easily obtained. No two business entities can have the same number. The cost of issuing and maintaining CICs must be minimal to the government. A universal number that facilitates the access to data bases containing additional trading partner information can provide the government with added value. The CIC must also be scaleable to support new trading partners who will do business with the government in the future.

Existing CIC Systems

Five CIC systems already exist that have the potential for use in the government-wide EC system. They are described in the following subsections; additional detail is provided in Appendix D. Information was gathered from other private industry companies. However, none had a comparable CIC system usable for registration.

Taxpayer Identifying Number (TIN)

The TIN was developed by the Internal Revenue Service (IRS) and is required under the Code of Federal Regulations subsection 301.6109-1. The TIN consists of two types of identifying numbers: social security numbers (SSNs) and employer identification numbers (EINs). The SSN identifies individuals and consists of nine numbers in the form of 000-00-0000. The EIN identifies corporations, partnerships, nonprofit associations, trusts, etc. It also consists of nine numbers but in the form of 00-0000000. If an employing entity operates multiple payroll centers, each is assigned an EIN for tax and withholding purposes. There are currently no methods used by IRS to authenticate the person or business entity. Information submitted is regarded as authentic. The IRS restricts access to the TIN information. By specific request, names (using a four digit name control character) can be matched to a TIN, but the response is limited only to whether or not the TIN submitted is valid. There are approximately 28 million EINs that match SSNs. Federal Privacy Act laws may prevent Agencies from using TINs to identify business entities outside the government.

Data Universal Numbering System (DUNS®)

The DUNS® number was developed by Dun and Bradstreet Corporation in 1962 to identify businesses in its automated files. Over 20,000 new numbers are assigned annually from a single site. Numbers are assigned by two methods: as a result of research on specific businesses requested by Dun and Bradstreet customers or direct request by a business over the telephone. The DUNS® number is a registered trademark. The number consists of nine digits: the first eight are machine-generated at random, and the ninth is a check digit added to improve accuracy. There are plans to expand the number to 11 digits by adding a two-digit prefix. Approximately 35 million numbers have been issued worldwide. Of that, 11 million are active domestic firms.

The DUNS® number is widely known and used throughout the business community. Numbers are assigned to businesses based on two criteria: physical location or distinct and separate operations. In the simple case, a business at a single location may be assigned a DUNS® number. However, if the headquarters and branch of a business are at the same location, each will have a DUNS® number if its operations are distinct. The DUNS® supports a family tree structure that links locations, parents, subsidiaries, headquarters, and branches. The tree structure illustrates the hierarchical relationship between entities. Their authentication methods consist of computer system checks and operational procedures. All requests for DUNS® numbers that state they are part of another entity are confirmed with the headquarters location of that entity. Many industries have adopted the DUNS® number as the preferred EC CIC. The number is used by 54 U.S. industries to identify trading partners for EDI. There is no cost to have a DUNS® number assigned.

An optional DUNS® numbering system adds a four-digit suffix. The suffix helps businesses at a single location distinguish between separate functions such as human

resource or accounting departments. The suffix is neither maintained nor distributed by Dun and Bradstreet.

Contractor Establishment Code (CEC)

The CEC was developed to support systems operated by General Services Administration's (GSA) for the Federal Procurement Data System. The code was developed based on requirements specified in a 5-year contract awarded by GSA. In this arrangement, Dun and Bradstreet is the current contractor, but the government owns and controls CEC. The code consists of eight numeric digits machine-generated randomly and a ninth alphabetic check character. The majority of CECs were converted from existing DUNS[®] numbers. There is a crosswalk between CEC codes and DUNS[®] numbers. To control the costs of registration, only government contracting officers can obtain CECs. Although the CEC is included in contractual documentation, many trading partners are not aware of its significance; therefore, the CEC is not widely known in the business community.

The cost to the government is \$1.20 if the firm already exists in the DUNS[®] data base and only a CEC code is issued. If the firm does not exist and research is performed in order to issue the CEC, the cost is \$20. There are approximately 260,000 domestic and foreign CEC. The GSA is seeking to establish CEC as a Federal Information Processing Standard.

Commercial and Government Entity (CAGE) Code

The CAGE code was developed by DLA for use in supply management. The CAGE code consists of five alphanumeric characters. The first and last positions are always numbers; the middle three may be numbers or letters, for example, 1ABC2. There are currently 639,000 CAGE codes, with the majority issued to domestic businesses. Government contracting officers obtain a CAGE code by submitting a Request for Assignment of CAGE Code (DD Form 2051) or requesting a code through a 24-hour electronic bulletin board service. Validation of the information is done through two methods. The first consists of a survey distributed through the mail every 3 years. Since only a small number of surveys are returned, DLA has suspended distribution of the survey for 6 months. The second method requires contracting officers to gather and update information. DLA relies on this method to keep the data base up-to-date. A recent DLA internal study estimates the CAGE data base is 80 to 83 percent current. Information in the CAGE data base is available to the public under the Freedom of Information Act. There are plans to add 14 new data elements to the data base. DLA is willing to migrate to a common company identification code.

Procurement Automated Source System (PASS)

The Small Business Administration, with assistance from the Department of Energy, developed and implemented the PASS in 1978. The system is a repository of information on small businesses nationwide that are interested in Federal procurement opportunities. The PASS data base record contains a unique internal code called the ID. The ID, created through an algorithm that combines the company's name, zip code, and an optional sequential number, has a maximum length of 16 characters. The SBA maintains that the ID is not available for use as a CIC in the EC environment because the code is intended for internal use in PASS.

Creation of a New CIC

An alternative to using an existing CIC is to create a new one. The advantage here is that a new CIC would meet all of the desirable characteristics outlined below. However, a new CIC could be confusing to trading partners already faced with an array of existing numbering systems. It would also lack familiarity in the business community—an issue that is critical to the acceptance and success of EC.

A new CIC system can be developed with relative ease using available data base software. However, it takes significant manpower and financial resources to perform timely research that monitors mergers and acquisitions to maintain the integrity of the numbering system and to ensure trading partners are not registered multiple times. This represents time and resources that could otherwise be allocated wisely toward other EC efforts.

CIC Criteria

Specific criteria used to evaluate CICs are as follows:

- Unique. The CIC must be unique to identify a trading partner. There cannot be any duplicate numbers issued.
- Coordinated by a single entity. It is essential that a single entity coordinates the assignment of CICs and maintains the supporting information. This arrangement helps to guard against the assignment of duplicate identification codes and serves as a single point of contact for CIC-related matters.
- Easy to obtain. The process to obtain a CIC should be simple for trading partners. The information required from them should be appropriate and the assignment of the CIC should be timely. CICs should also be accessible to procurement officials in a timely manner.
- Applicable to a wide range of industries and uses. A CIC must be readily assignable to all organizations, for example, trading partners, distribution carriers, and the Federal government.

- Minimal cost to government. Cost to the Federal government must be minimal. Cost includes issuing, operating, and maintaining a CIC system. Low cost is critical in a climate of shrinking budgets.
- Global application. CICs must be available to all trading partners regardless of geographic location to promote EC among all users.
- Continuity. CICs should be changed only in the case of merger or acquisition. A consistent policy regarding change will provide the capability to trace the history of a trading partner.
- Site-specific assignment. A trading partner should be assigned a CIC if it has distinct operations at a single location. Validation procedures should be established to guard against the assignment of multiple CICs to the same trading partner.
- Accurate supporting information. Supporting information on trading partners must be accurate, timely, and up-to-date. Procurement officers doing business with trading partners should regularly update performance data. Where applicable, trading partners are required to update their business profile.
- Permits growth. It is desirable that the structure of the CIC be scaleable to support future trading partners that will do business with the Federal government.
- Limits on use. The Federal government must have perpetual rights to CICs that are free of restrictions for use in applications or computer records of the Federal government and other organizations.
- Access to supporting information. Once a CIC is assigned, it is desirable that past performance, trading partner lists for commodities and services, small business categories, and financial information are readily available for authorized government officials.

Recommendation

The DUNS[®] number has many advantages over other CICs. Although it is the intent of every CIC system to assign and maintain a unique number, in practice, duplicate records are found in all of them. Over the years, Dun and Bradstreet has created an extensive data collection program that focuses on maintaining an accurate data base and unique numbers. They have developed a specialized process that concentrates on locating and eliminating duplicate records. Other systems, such as PASS and CAGE, are limited by small staffs and mail-based surveys to validate information. CAGE is dependent on contracting officers for validation. For the TIN, the responsibility lies with the taxpayer to discover duplicate numbers only after delinquent tax notices have been issued. There are 28 million duplicate TIN numbers (EINs that are the same as an SSN.)

The DUNS[®] number is recognized domestically and internationally for identifying businesses when doing EC. Other CICs are recognized in their specific areas, but none

are more recognized or accepted on a global scale for commerce. Dun and Bradstreet plans to expand the number by two digits to support a growing worldwide business community.

DUNS[®] numbers are routinely assigned to business entities during the course of Dun and Bradstreet's ongoing research. When Dun and Bradstreet customers request information on new businesses, numbers are assigned automatically. In fact, most Federal government trading partners already have a DUNS[®] number. Trading partners that do not have a DUNS[®] number can request one, and it will be issued quickly at no cost to the trading partner or the government. Dun and Bradstreet's policy of issuing numbers based on physical location and on performance of separate and distinct operations will enable the government to accurately recognize a trading partner in EC.

Dun and Bradstreet Information Services has offered the government a perpetual license to use the DUNS[®] number for electronic commerce. Dun and Bradstreet is concerned about maintaining the integrity of its numbers and preventing its competitors from obtaining unlicensed access to DUNS[®] commercial information for distribution purposes.

Adopting DUNS[®] for EC now does not preclude using another number in the future if conditions change or circumstances warrant a change. Each numbering scheme discussed serves a purpose that should continue. DUNS will serve as a cross-reference to trading partner information in Federal supply, procurement, and financial systems and offer linkage to these other numbering methods where appropriate.

ADMINISTRATION OF THE REGISTRATION PROCESS

The DoD December 1993 *EC/EDI in Contracting* report makes two recommendations regarding registration that will be used for a Federal EC system:

- First, use "a DoD standard, electronic registration process for EC trading partners." This approach captures registration information in a DoD repository of trading partner profiles on EC business. The repository provides on-line communications with contracting activities and dial-up connection for inquiries by those contracting activities without an EC capability.
- Second, "designate an activity to centrally manage [the] registration process." In addition to receiving all EC trading partner registration information, the proposed central activity would also maintain the data base and provide connectivity to DoD automated information systems capable of transmitting via EC. This activity could also manage the trading partner agreements.

In a comprehensive survey, the Federal procurement community was asked about existing EDI registration processes. The survey results showed there were none to serve as a model for the government-wide system, which could grow to an estimated half million trading partner profiles. DoD has assigned approximately 640,000 CAGE

codes, each representing a potential trading partner. Some 20 percent of these numbers are not valid. Many are duplicate numbers of those listed in the CEC file. The Federal Procurement Data System has only 260,000 CEC codes assigned. The upper range is then 400,000, and the lower range is 260,000. While EC is projected to increase the number of trading partners doing business with the government, an estimated increase of 25 percent over the upper range would equal 100,000 new trading partners. When added to the upper range we might have 500,000 trading partners. This estimate is highly optimistic.

DoD has agreed to develop and operate a Federal Trading Partner Registration system. It has a plan and a team working on a solution that can accommodate this report's recommendations for trading partner registration.

Agencies must work toward a common file structure for trading partner information based on the Federal Trading Partner profile.

AUTOMATION OF REPRESENTATIONS AND CERTIFICATIONS , AND TRADING PARTNER AGREEMENT

The central trading partner registration information system will allow many of the present paper processes to be automated or at least to supplement present processes. The representations, certifications, clauses, and the trading partner agreement can exist as text files at the VANs for trading partner use. Representations and certifications and the TPA can be electronically incorporated into the registration process by placing them with the approved VANs, which would provide this information to the trading partner during registration. This electronic capability would allow for representations and certifications to be done on an annual basis and allow for acknowledging the TPA. It should be noted, however, that the contracting officer's ability to request this information for a specific EC contractual action will not be hindered.

Rather than transmit full text provision, clauses, representations and certifications in EC transactions, a standard integrated information system containing this information, accessible to all trading partners through a text file, must be established. This file would provide trading partners, upon request, with the full text of the clauses, representations and certifications, and TPA, including the following:

- An integrated Federal EC master solicitation data base. This Federal EC master solicitation could be used to develop several tailored master solicitations that would provide the full text that reflects a broad category of acquisition (i.e., developed for a specific commodity).
- A complete electronic copy of the FAR and supplemental regulations, provisions, and clauses. This would allow for more accurate, timely, and cost-effective maintenance of these regulations.

DoD should be responsible for coordinating updates to the standard TPA, Representations and Certifications and master solicitation provisions and clauses.

Any trading partner would have access to the agreement since none of the information contained would be confidential. During registration, a trading partner would electronically acknowledge agreement to be bound by the TPA. Changes made by the government to the TPA would be electronically distributed to the VANs and the trading partner. All changes must be acknowledged by the trading partner.

REGISTRATION STEPS

The following procedures for trading partner registration (Figure 3-1 shows the steps) should be used:

- Step 1. A vendor obtains a DUNS[®] number. Dun & Bradstreet will assign a DUNS[®] number for any vendor that does not already have one. A can call Dun & Bradstreet (610-882-7748) for a new number or to verify its current number without cost.
- Step 2. The vendor selects translation software (if not currently doing EC/EDI.) A number of software providers have been certified as complying with the Federal implementation conventions. If vendor selects or uses software that has not been certified, the software will require certification prior to beginning to exchange EC/EDI transactions.
- Step 3. The vendor selects a VAN provider. The VAN should be certified as participating with the Federal EC/EDI program and has signed the VAN agreement with the Government. If the VAN provider is not a certified VAN it will need to have an inter-VAN agreement which will permit sending and receiving transactions between the NEP and the vendor.
- Step 4. The VAN provides the Federal EDI trading partner agreement (see Appendix E) and representations and certifications. These pre-registration documents must be read and acknowledged by the vendor. Language will stipulate that a condition of vendor registration is agreement with the terms and conditions of the TPA, and representations and certifications. If a vendor sends an 838, Trading Partner Profile, and acknowledges the TPA and representations and certifications, the Federal government will construe the act as the vendor's intention to be bound by the TPA and as having submitted representations and certifications. Further, the trading partner agrees to keep its registration information and representations and certifications current and accurate.
- Step 5. The vendor sends an 838 transaction via the VAN to the central trading partner registration information system. Within this standard transaction set are fields that define the information that must be provided. There is flexibility, provided agreement is reached in advance, on what information will be transmitted and where it will appear in the transaction set. (This agreement is called "an implementation convention," discussed later in this chapter.) The 838 transaction is translated and information is verified before registration is completed. If the original 838 registration information is incomplete or inaccurate, an EDI

transaction is sent to the vendor asking for missing or correct registration information.

- Step 6. When all information is accurate and complete, the central registration site assigns a confidential trading partner identification number (TPIN) and sends an 838 confirmation transaction acknowledging registration as an EC trading partner. (The TPIN is a confidential system access identification number used to identify positively a trading partner when changes are being made to existing registration information.)
- Step 7. The central trading partner registration information system provides trading partner profiles to the agencies' automated procurement and finance systems. Updates would be provided to the agencies as they are received.

Agency procurement offices will be able to request specific trading partner profiles from the central trading partner registration information system.

This same process can be used by non-EDI vendors to register with the Federal government for procurement opportunities.

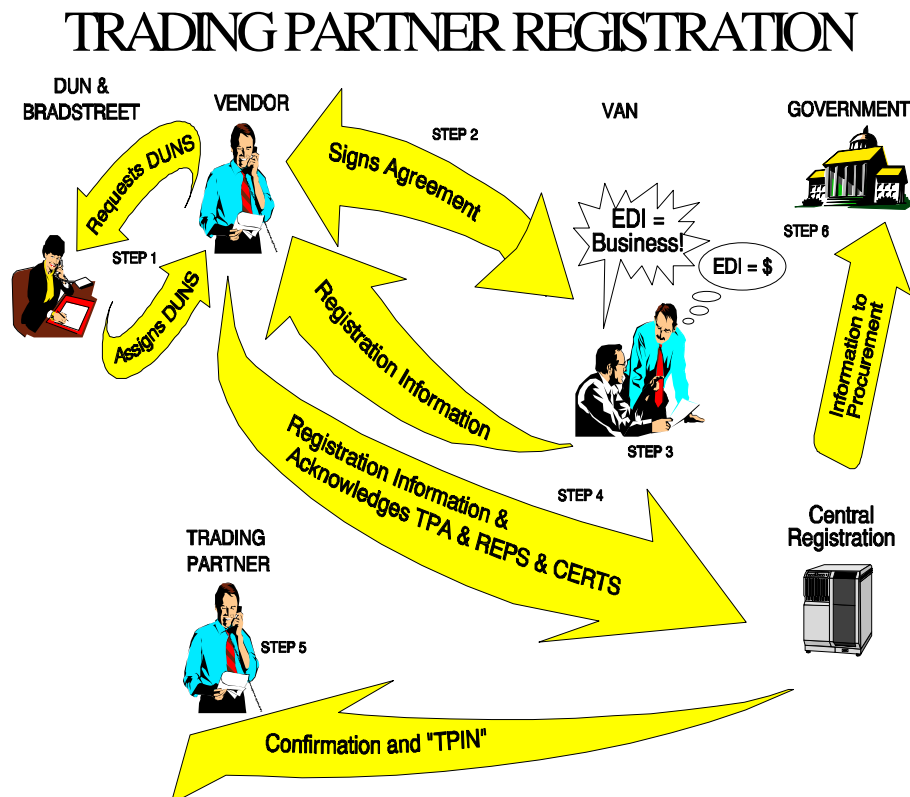


Figure 3-1. Trading Partner Registration

Figure 3-2 shows the components of registration. The registration information data base, the core of these components, provides electronic interfaces with other data bases. Before vendors register, an electronic file consisting of the full text of the TPA, representations and certifications, and master solicitation will be available for review from their VAN (the file will be managed and distributed by the central trading partner registration component). During registration, the DUNS®, CEC, CAGE, and TIN numbers submitted by the vendor will be validated against their respective data bases. If any are incorrect, notification will be transmitted to the vendor identifying the error. Next, the vendor's address will be compared with the Department of Labor's Labor Surplus Area List and the GSA's List of Parties Excluded from Federal Procurement or Nonprocurement Programs. The vendor's status will be recorded in their registration record. After registration, the trading partner registration information will be provided to procurement and finance offices throughout the government for use in their automated procurement systems. Later, when awards are generated, the information will be transmitted to the Federal Procurement Data System (FPDS). FPDS will then provide basic award information to the Past Performance Information data base. Procurement offices will be polled at contract completion on quality of performance. Information from the Past Performance Information data base will be used to determine a supplier rating that will be transmitted with the trading partners registration record.

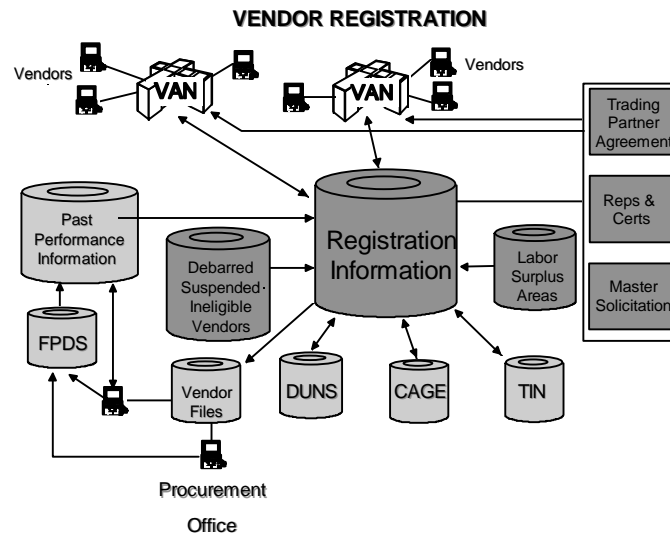


Figure 3-2. Components of Trading Partner Registration

MARKETING PLAN FOR EC TRADING PARTNER REGISTRATION

Marketing will emphasize the benefits of EC, such as a single-point registration, electronic payment processing, increased opportunity for small businesses, reduced acquisition times, and reduced inventories.

The overall marketing plan utilizes both the government and vendor community to the fullest extent possible.

A lead Federal agency will coordinate activities of the government and oversee the entire program. It is expected that the Small Business Administration will provide a leadership role to the small business community on EC. Initial targets should include the small business community; chambers of commerce, and state and local government entities. A 1-800 telephone service could be employed to provide information about EC and assist with registration. Conferences should be planned to coincide with EC implementation.

The lead Federal agency sets policy, defines the program mission, and allots responsibilities among the other participating Federal agencies. In addition, it formulates a budget, requests appropriations, monitors expenditures, and reviews accomplishments.

It is especially important that EC marketing comply with a government-wide plan. This will assure a “single face to industry.”

We recommend the following implementation:

- Develop a government-wide plan. The lead Federal agency will direct the development of a comprehensive plan covering a time period for promoting and publicizing the EC program. The lead Federal agency will coordinate the implementation plan with other Federal agencies.
- Assign implementation responsibilities. The lead Federal agency will coordinate assigned responsibilities for implementing the plan with agencies.
- Prepare marketing packages. The lead Federal agency will identify and coordinate the preparation of the marketing requirements.
- Advertise the program. The lead Federal agency will identify opportunities for publicizing the EC program and assign responsibilities for fulfilling those opportunities.
- Monitor the program. The lead Federal agency will monitor the status of the marketing and report on the results to OMB and participating agencies.

REQUIRED CHANGES TO GOVERNMENT REGULATIONS

Presently, paper is the most common medium for the Federal government to disseminate and provide regulatory and procedural information. This method of disseminating information has been effective; however, it does not meet the needs of the future and in some ways does not meet today's needs.

Procedures that are used for EC are designed to operate under existing regulatory guidance in the Federal Acquisition Regulation (FAR) and other supplemental regulations and procedures. As the development and use of EC become part of our daily lives, there must be a recognition that this new enhanced method of doing business must

be reflected in all relevant government regulations. In addition, procedures that are currently accomplished manually via a paper process (clauses, provisions, certifications, and representations) must be redesigned to maximize the use of EC methods.

The principal problem is the language that specifies the use of paper methods, such as a written document or certified mail, and does not allow for electronic transmission of these documents. There are several minor changes that need to be made to the FAR to set electronic contracting methods on a par with paper methods.

The Defense Acquisition Regulation (DAR) Council has undertaken the task of placing electronic methods on a par with paper methods within the FAR. It has generated the needed FAR changes and is starting the review process, but much work still needs to be done. Changing the FAR to allow for electronic methods is only the beginning. Regulations that are supplemental to the FAR will require similar changes to allow for electronic contracting methods. It is imperative that these supplemental regulations are not overlooked.

Further, consideration should be given to standardizing all nonstandard documentation (i.e., clauses, certifications, representations, provisions, and other regulatory language) presently being added to contracts at each procurement office. Standardizing this language and making it available at a central location will eliminate the need to transmit full text documentation in each procurement.

For example, an offeror should be able to provide discounts for prompt payments through EDI at the time the offeror registers to become a trading partner with the Federal government. The discount terms offered by this method would apply to all payments to the offeror and eliminate the need for the offeror to repetitively provide this data to the government on contracts and invoices. EC trading partners will be allowed to provide, at the time of registration, their prompt payment discount terms (e.g., 2/10 net 30) to apply to all payments made to them. The FAR may need to be changed to allow for EDI notification of discounts for prompt payment at time of registration into EDI.

VALUE-ADDED NETWORKS IN THE FEDERAL ELECTRONIC COMMERCE SYSTEM

VALUE-ADDED NETWORKS

An EDI VAN is a communications network that transmits, receives, and stores messages for EDI trading partners, generally through an electronic mailbox. Figure 3-3 shows the EDI process. Trading partner A puts an EDI message for trading partner B in the VAN mailbox at a date and time of its choosing. The VAN picks up the message from the mailbox and delivers it to trading partner B's mailbox where it will remain until trading partner B logs on and picks it up. Trading partner B responds to trading

partner A in the same fashion. The cycle repeats itself on a weekly, daily, or perhaps even hourly basis as needed.

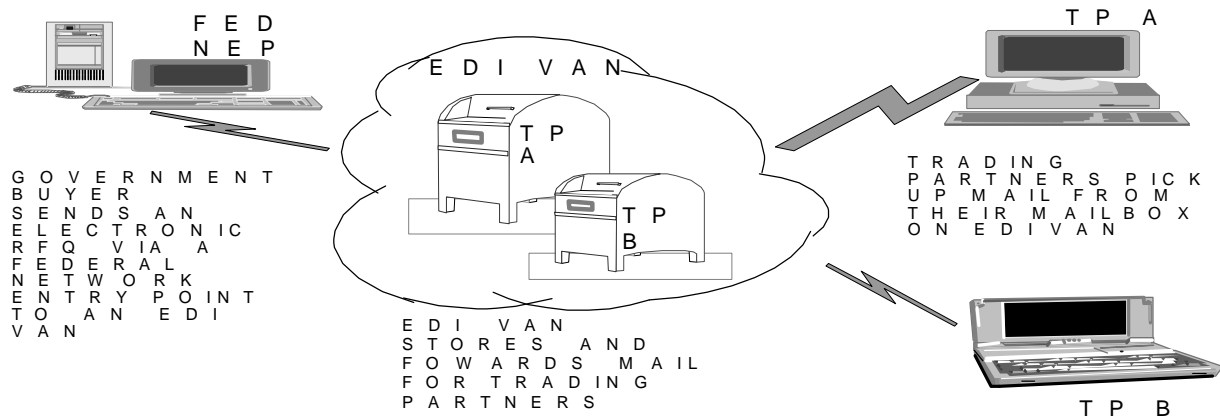


Figure 3-3. EDI Process

Whether a VAN is needed is a question of simple logistics. For example, a business that wants to use EDI with 100 different trading partners has several choices for its communications:

- It can buy a multiport modem capable of handling 100 incoming phone lines, install 100 phone lines, add 100 communications ports for its computer system, and allow each trading partner to communicate directly at its convenience.
- It can use a single modem with a phone line and arrange a tightly controlled schedule for each of its trading partners, for example, 12:00 a.m.– 12:10 a.m. for trading partner B, 12:11 a.m.– 12:21 a.m. for trading partner C, etc. The problems with this alternative are obvious when a trading partner misses its turn or has too many EDI messages to fit into its 10-minute slot.
- It can establish an electronic mailbox on a VAN and require each trading partner to use VAN for sending and retrieving EDI messages. This alternative works well because, as a practical matter, most VANs maintain a large number of access points (known as ports, lines, nodes, etc.) to their networks and can spread the costs of maintaining these ports among their clients. Thus, a large number of trading partners can access the VAN at their convenience without encountering blockage from other trading partners and at relatively low cost.

Large EDI-capable businesses and government agencies with more than a handful of trading partners almost always rely upon VANs, and small organizations with six or more trading partners are good candidates for using VANs, as are organizations with minimal internal expertise regarding computers, modems, telecommunications, and EDI.

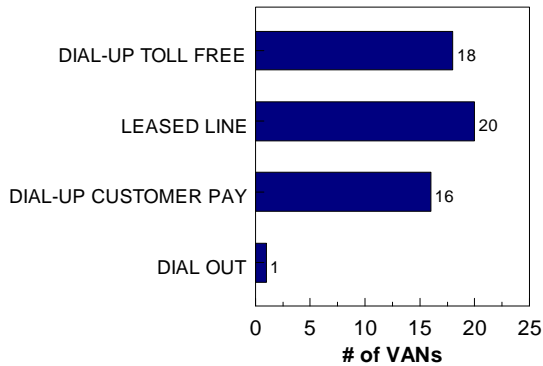
Many businesses find that the choice of a VAN is made for them by their trading partners. When a large customer or supplier approaches a buyer to begin using EDI,

the organization likely is already using EDI with other partners and has already selected one or more “official” VANs. An organization that is in a position to select its own VAN should consider the VANs reputation and experience, level of technical support and service capacity, and ability to cope with network outages. Other factors to consider include whether or not the VAN operates its own communications network or leases capacity from a network provider, the means of connectivity to the VAN, and costs.

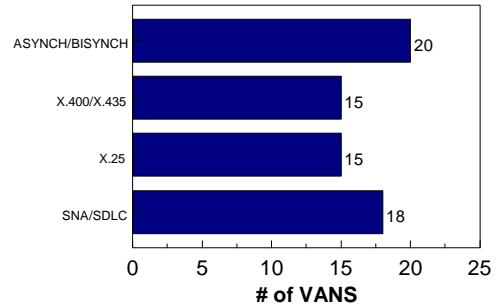
Services and Capabilities

Figure 3-4 displays the services and capabilities provided by VANs and the typical industry standards or practices they use.

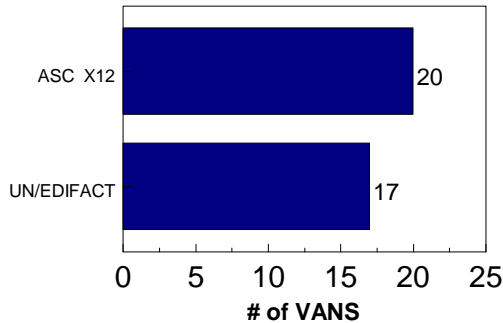
ACCESS METHODS AVAILABLE NETWORK ENTRY METHODS



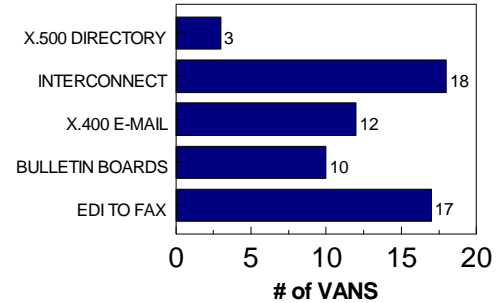
PROTOCOLS SUPPORTED COMMUNICATION PROTOCOLS



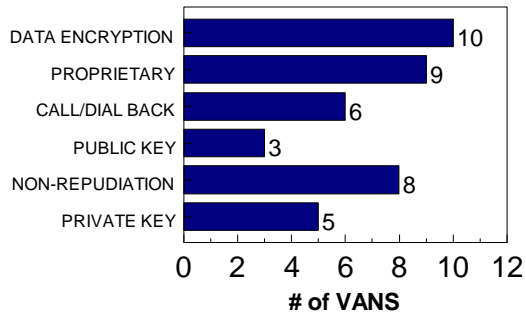
TRANSACTION SETS SUPPORTED TRANSACTION SETS



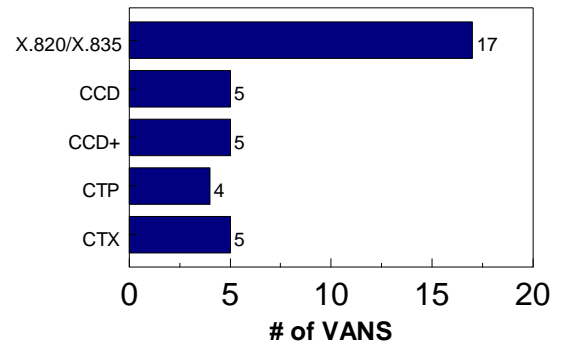
VALUE-ADDED SERVICES SERVICES



DATA SECURITY SECURITY CONVENTIONS



FINANCIAL DATA SUPPORTED FINANCIAL TRANSACTION SETS



(EDI World magazine, February 1994.)

Figure 3-4. Standard Commercial Practices Among VANs

Service Fees

Currently there are about 30 providers of EDI network services. Some companies provide only the network for electronic communications, while others provide services as customizing vendor profiles to screen procurement data. While individual VANs vary, charges can be categorized as shown in Table 3-1. Fixed and variable costs are shown in Table 3-2.

Table 3-1. VAN Services and Fees

Service	Fee
Start-up costs Start-up time ranges from immediate delivery to 3 days	Varies depending on EDI readiness of the government agency and the trading partner, the number of trading partners, line attachment options (i.e. asynch) and application options \$0–\$1,200.00
Basic service <ul style="list-style-type: none"> • Monthly with minimum number of transactions • Mailbox 	\$0–\$100.00 \$0–\$50.00
Network usage <ul style="list-style-type: none"> • Session fee—Charge each time you log-on to network • Transaction fee—Varies depending on character volume • Envelope fee—Some VANs batch non-time-sensitive transactions into one envelope and send as a single transaction • Volume discounts—May be applied to monthly variable costs or to the number of electronic business documents sent and received 	\$0–\$1.00 per session and the cost to access the network (i.e., local vs. long distance phone call). \$0.07– \$0.35 per 1,000 characters \$0.15–\$0.37 per functional documents in one envelope 25%–75% Volume discounts can be negotiated
VAN interconnects	Monthly fee range of \$0–\$40.00 Monthly fee plus usage

Table 3-2. Fixed and Variable Costs for VAN Services

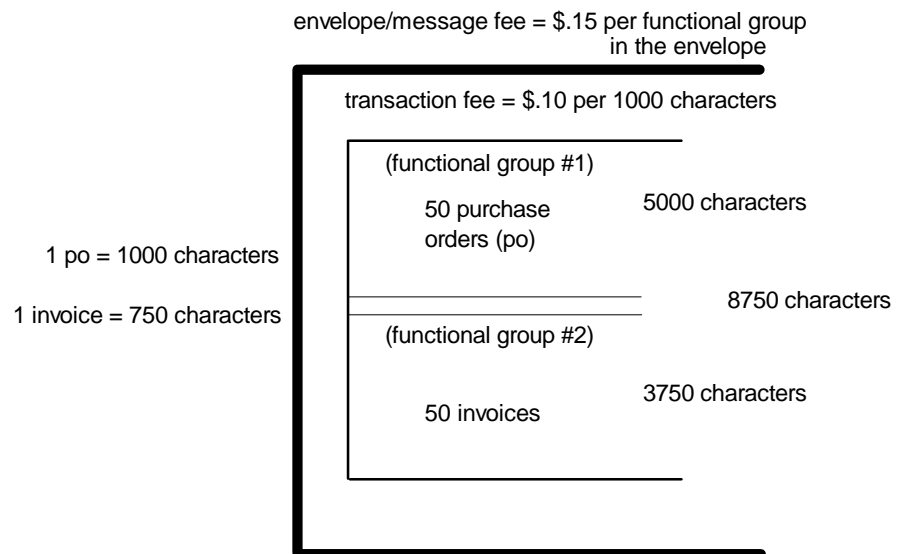
Fixed Costs	Variable Costs
Initialization fee (one-time cost to get a mailbox on the VAN)	Envelope/message fee—delivery of functionally similar EDI documents
Session fee	Transaction/document fee—fee for the number of characters in each document such as a purchase order or an invoice
Mailbox fee	
Interconnect fee	

As shown in Table 3-1 , VANs have many ways of billing for particular services. Typically, customers can pick and choose these services and are billed accordingly. These services may include EDI translation software and support, EDI to fax support, E-mail capability, inter-VAN connectivity, and most common, transmission of ASC X12 documents. In regard to “basic” EDI service, VANs charge an initial installation fee and a monthly mailbox or users fee. In addition, the customer pays according to usage. Usage is defined as the number of transactions sent and received by the customer, or trading partner. These transactions are sometimes broken into kilocharacters.

Table 3-2 estimates the costs of two types of government transactions: sending a purchase order to a trading partner on the same VAN and sending a purchase order to a trading partner on another VAN. The estimate is based on typical VAN services and average commercial costs and assumes a one-to-one relationship between an agency and a VAN. Let us assume that most government network entry points (NEPs) will require only basic services from the VANs. These services include EDI and/or EDIFACT transmission support, archiving, and audit trails of government transactions. We add the initiation fee and basic monthly subscription fees to these service charges to calculate an average monthly fee. The agency has a contract with a VAN to transmit documents to agency trading partners. The start-up cost is the cost to open an account with the VAN. If no transactions are sent, there is only the monthly charge for the mailbox and interconnect fee. Since most VANs offer volume discounts, the variable costs per transaction will decrease as the number of transactions sent increases. Figure 3-3 shows EDI costs for typical procurements.

Table 3-2. Transaction Fee Structure

Cost Scenario	Monthly Fixed Cost		Variable Cost	
Transmit a purchase order via VAN A to a trading partner on the same VAN. The average size of a purchase order is 1000 characters.	Mailbox	\$25.00	Session fee	\$.00
	Interconnect	15.00	Envelope fee	.15
			Transaction fee	.10
	Total	\$40.00	Total	\$.25
Transmit a purchase order via VAN A to a trading partner on VAN. B. The average size of a purchase order is 1000 characters	Mailbox	\$25.00	Session fee	\$.00
	Interconnect	15.00	Envelope fee	.15
			Transaction fee	.10
			Interconnect usage fee	.10
	Total	\$40.00	Total	\$.35



Envelope/Message fee = \$.15 x 2 functional groups in one envelope = \$.30

Transaction fee = (8750/1000) x .10 = \$.875 for 100 electronic business documents

The network usage charge to send 100 procurement documents electronically is \$.39

Figure 3-3. EDI Costs for Typical Procurement Documents

FEDERAL GOVERNMENT USE OF VANs

VANs will play an integral role in the government EC system. At a minimum, the government will use VANs to communicate business transactions with trading partners. VANs will assist with trading partner registration by providing TPA and representations and certifications files to trading partners. In addition, the government will look toward VANs to recruit and educate trading partners and to offer value-added services to small businesses that may not be technically self-sufficient. The incentive for the VANs is the increase in business that will be realized as the government increases its use of EC.

In general, the government will use two types of EC transactions: one-to-one and one-to-public. One-to-one transactions—purchase orders, delivery orders, and contract modifications—are those sent to a specific party. One-to-public transactions—requests for quotes (RFQs), requests for proposals (RFPs), and notices of award—are for public viewing. The EC architecture will make these public transactions available to the VANs, which then will provide the information to the trading partners. Some VANs offer the additional service of sorting these actions according to type based on their trading partner's business area. For instance, the VAN would send a trading partner that manufactures chairs only RFQs for office furniture.

Presently, Federal government agencies use VANs for proprietary links, direct dial, and Internet communications connections for individual point-to-point EDI transactions. An agency with 700 trading partners in a proprietary environment is required to provide protocols, procedures, time, and accurate data input to each of the 700 trading partners. It takes a full shift of personnel to administer such a process. VANs are recommended as a major component of the EC architecture because they reduce this implementation activity. VANs provide these services to trading partners and eliminate the government's participation in this phase of the EDI end-to-end implementation. VANs also provide more access to EDI-capable partners and consequently promote more business generally. Finally, since they provide a wide range of communication protocols, VANs eliminate most hardware/software compatibility problems.

Different VANs have tailored their services to different industries. Presently, a minority of the trading partners who conduct business with the government choose their VAN services based on their industry or major customer requirements. The government conducts business across many industries including furniture, health, aerospace, transportation, grocery, and automotive. While some VANs focus on particular industries, others target their services to the users' level of sophistication. The market for VAN services is changing rapidly; new VANs are emerging, consolidation is occurring, and services and pricing strategies are changing.

Currently, direct connect (data from government computer to trading partner computer), dial-up 800 number, or dedicated line (if volume of business warrants the cost) are the means of EDI communications. Approximately 30,000 U.S. firms are EDI

capable and use VANs and the valued-added services on a point-to-point basis. Additionally, over 300,000 vendors are interested in conducting business via EDI with the government. A consolidated, integrated, distribution method using VANs is the most cost-effective way to conduct business with this vendor base. In contrast, direct connect, point-to-point communications with this potential vendor base is neither efficient nor cost-effective. Furthermore, VANs will act as the primary catalyst for promoting and maintaining standards between government and industry.

Role of VANs in Government-wide EC Architecture

The government has decided to use multiple NEPs and multiple VANs for government-wide communications and EDI implementation. Each NEP may support multiple agencies and will probably connect to more than one VAN. This architecture will enable the government to centralize and expand its telecommunications capability, ensure continuity of operations, centralize trading partner registration, and employ a regional focus. The VAN/industry EDI community can already support the government's requirements, and a multiple VAN approach ensures the availability of a wide range of VAN services, including the specialized services tailored to particular industries. It also prevents the establishment of a monopolistic environment.

The government will select VANs on the basis of their ability to satisfy standard technical requirements of the government-wide EC system. In addition, VAN providers will be asked to agree to uniform terms and conditions outlined by the government. A formal *Federal Certification Agreement for EDI VAN Services* will be issued to the VAN provider after successful government testing.

Technical Requirements

The technical requirements are outlined in Appendix F. These requirements apply to all program and functional areas supported by the government's EC system. Initially, the government-wide EC infrastructure will be used to support Federal procurement functions. Eventually, the infrastructure could support EC and EDI in other functional areas.

In general, the VANs must be able to

- support specific versions and releases of X12 and EDIFACT standards,
- provide affiliated services to enable interested business to receive and send ASC X12 transactions using standard Federal implementation conventions,
- use methods such as ASC X12.56, Interconnect Mailbag Control Structure, or X.400, File Transfer Protocol,
- use standard interface methods (dedicated circuit, toll-free telephone call, and Internet) between the government distribution points and the VANs,

- provide services for specified hours of operation,
- meet defined backup, data recovery, and audit requirements, and
- meet requirements for a disaster recovery plan and backup facilities.

Certification Test Plan

The backbone of EC is reliable and efficient telecommunications support that allows for the successful exchange of information between the government and the trading partner. Critical to this process is the VAN whose primary function is to support the exchange of data between trading partners using universally recognized data formats. The VAN portion of the systems test includes all technical and program requirements identified in Appendix F.

The VANs will be required to participate in a full communications test using a transaction exchange method outlined in the VAN technical requirements. In particular, VANs will be required to demonstrate their ability to

- accept and transmit data using ASC X12 standards,
- accept and transmit data using EDIFACT standards,
- accept and transmit binary and ASCII data,
- broadcast one-to-public transactions,
- transmit one-to-one transactions, and
- transmit one-to-many transactions.

The VANs also will be required to demonstrate capability for both inbound and outbound transactions from various communication points:

- Government NEPs to VAN (outbound) to assure that transaction data transmitted by the government to the VAN can be retrieved successfully by the VAN and delivered to the trading partner.
- VAN to government NEPs (inbound) to assure that transactions sent by the trading partner can be forwarded by the VAN and retrieved by the government system in accordance with the terms and conditions specified by the *Technical Requirements for EDI VAN Providers* document.
- Alternative government NEPs to VAN (outbound) to assure that data transmitted by an alternative government site to the VAN can be successfully retrieved by the VAN and delivered to the trading partner. Transmission of data to the VAN from the alternative site will be a result of an earlier failure by the primary government system.
- VAN to alternative government NEPs (inbound) to assure that transactions sent by the trading partner can be forwarded by the VAN and retrieved by the alternative government NEP in accordance with the terms and conditions specified by the *Technical Requirements for EDI VAN Providers* document. The alternative government NEP access to the mailbox will be the result of notification by the primary government point that it is unable to access the mailbox.

The above tests will include data transmitted to trading partner via VAN interconnects. In addition to the above testing, VANs will be required to demonstrate that their data recovery and archive retrieval capabilities are in accordance with the terms and conditions of the *Technical Requirements for EDI VAN Providers* document. Specific functions to be tested include the following:

- VAN recovery and retransmission to trading partner to assure that data archived by the VAN can be retrieved and retransmitted to the trading partner without erroneous duplication or omission of data.
- VAN recovery and retransmission to government NEP to assure that data archived by the VAN can be retrieved and retransmitted to the government NEP without erroneous duplication or omission of data.

A step-by-step testing plan has been developed by DoD based on the above criteria. The plan includes the identification of test data, type and number of transactions to be tested, the various paths of data flow, and a reconciliation process. As part of the VAN testing procedures, the VAN provider will be required to demonstrate backup capability using the same test criteria.

The VAN test will be incorporated into an overall EC system test plan that will demonstrate successful communications capability. The VAN test plan can be obtained from DoD, Coni Jackson (618) 256-9696.

Certification Agreement

The government will issue a *Certification Agreement for EDI VAN Services* to VAN providers that successfully pass the testing process. This document shown in Appendix G, provides evidence that the VAN provider has met, through a formal testing procedure, all technical requirements defined by the government and ensures an acceptable level of performance for end-to-end EDI implementation. It also outlines the terms, conditions, and requirements for the VAN provider and the government. The certification document ensures that the VAN provider is ready and qualified to carry EDI transactions between the government and its external trading partners. It ensures that VANs comply with Federal regulations and protects the government from liability of VAN nonperformance to government trading partners. It also ensures that government data is provided exclusively to VANs who have passed the testing requirements and have been certified.

Issuing a formal certification document to the VAN provider benefits the government, government trading partners, and the VAN provider. Generally speaking, each VAN has a different method of conducting business. The government has hundreds of unique automated information systems supporting the equally diverse methods of conducting business, and so do the trading partners. Now, the government is mandated, by Presidential order, to standardize its business practices. A formal, agreed-upon standard for technical operation is necessary to ensure that this objective is met. Many VANs provide a basic service agreement to their customers. The government, however, in the interest of establishing a “single face to industry” and a standard way of doing business, has developed a service agreement based on government-wide technical requirements.

In addition, identifying those VAN providers who meet Federal requirements and have agreed to do business with the government in a standardized manner helps government trading partners choose reliable third-party networks and ensures that they will be able to participate successfully in the Federal EC initiative. It also provides a technical foundation that the trading partners may choose to adopt. Many small business trading partners are not technically sophisticated; having the government provide technical specifications for conducting business may help them get started more quickly. It also allows the trading partner to use the same system to do business with any government agency rather than having to modify its system to accommodate the different agencies with which it conducts business.

Finally, the VAN provider benefits from the formal testing and certification process. The government-issued certification provides a marketing tool for the VANs. It is easier for them to recruit trading partners for the government (and new customers for them) if they can demonstrate that they are official government providers and have passed the technical test required by the government. Also, having standard technical requirements, a standard recruitment process, and a standard testing and certification process provides the VANs with a standard way of doing business with the government. Once VANs are certified, they can do business with any Federal agency without having to repeat the testing process. This makes it much easier for them to manage their workload.

Payment Options

With the exception of the DoD models mentioned below, Federal agencies generally pay for their VAN services according to the VAN's commercial fee schedule. A few agencies also pay the VAN subscriptions for their small business trading partners.

Several payment options are being considered for the government-wide EC system: no cost to government; no cost for public transactions, but government pays for one-to-one transactions; or government pays for the cost of all transactions it sends. Another point of view suggests that the government charge VANs for public information.

The no-cost option has been tried by the Department of Defense (DoD). In October 1992, Wright-Patterson Air Force Base initiated a pilot EDI system called Government Acquisition Through Electronic Commerce (GATEC) and introduced the no-cost-to-government concept for VAN services. The GATEC model supports a multiple VAN approach that allows any VAN meeting GATEC technical requirements to participate in the GATEC system in exchange for providing free VAN services to the government. This arrangement was for the duration of the pilot. Likewise, in January 1994, DoD released a Process Action Team report on EC outlining DoD's plan for deployment of EC and EDI throughout the DoD and proposing a no-cost provision for VAN services for the first year of the project and a reevaluation at the end of the first year.

The argument that the government should receive no-cost VAN services for one-to-public transactions is based on the assumption that the Federal EC system will generate an abundance of new business for the VANs by providing free access to government RFQs. There is no justification for the government paying to disseminate this information even though it pays for duplicating and disseminating most public procurement documents in the current paper environment. The EC system architecture makes all one-to-public transactions from the various government sites available to all interested VAN providers free of charge. The VANs, in turn, will disseminate the information to paying customers.

VANs have the potential of making a significant profit from selling the information to trading partners. In FY92, the government had over 20 million procurement actions. Of these, 19.6 million were small purchases (under \$25,000). If these actions were sent via EDI, 19.6 million one-to-public transactions (RFQs) and one-to-one transactions (purchase orders) for the government would have resulted. If we include notices of award, the number of one-to-public transactions would have doubled. DoD's experience shows that advertising the RFQ increases the number of quotes received from any one action by six times. In addition, many procurement orders for services and small purchases generate multiple invoices. Clearly, government procurement actions generate multiple transactions, and therefore, multiple fees are collected by the VANs.

The issue of payments for one-to-one transactions, which the government will both send and receive, is a bit more complicated. For small purchases, the government probably will generate one one-to-one transaction for every RFQ released. (This does not include delivery orders against Indefinite Delivery Indefinite Quantity (IDIQ) contracts and contract modifications. These numbers are minimal compared to the number of RFQs and purchase orders released by the government and are usually associated with larger procurements.) In addition, we anticipate multiple actions being generated by trading partners for each RFQ. One VAN suggested that each RFQ will generate four actions. We believe that the number could be greater depending on the type of purchase, but we lack sufficient data to test this belief. Using the typical VAN billing structure, both the government and trading partners would pay equal costs for each one-to-one transaction sent between them. The issue then is whether the increase in government use of EDI will generate enough business to accommodate the company's profit margin and offset the government's costs for these actions. If the government does not pay for VAN services, the VANs will receive only half the revenue they would normally collect for each transaction or they will divert the costs to Government trading partners.

The idea of the government charging the VANs is based on the *Commerce Business Daily* model in which various companies pay the Department of Commerce for procurement information. These companies then sort the information and send it to their various subscribers. In addition, the Federal Acquisition Regulations (FAR) already allows the government to charge for the production of procurement documents.

INDUSTRY ASSESSMENT OF GOVERNMENT-WIDE EC SYSTEM

The ECAT met with about 20 representatives of the VAN industry on February 18, 1994, to obtain their input on the government's EC system. In addition to participating in open discussion at the meeting, the VAN providers were encouraged to submit written comments. Their comments are summarized below:

- VAN licensing (certification). VANs agreed that licensing is required to establish the rules of EC for all participants. The VANs and the Federal government must agree on basic terms and conditions for doing business. They suggested the license agreement be called a certification agreement. All VAN providers who meet the technical requirements will be tested for certification. Only government-certified VAN providers would be allowed to provide third-party network services to the Federal government.
- Inter-VAN issues. VANs continue to improve interconnectivity technology. They admit there is a need for standard addressing schemes in the VAN industry. The need for interconnectivity should be market driven and not included as a requirement in the EDI service agreements.
- Payment for services. Network traffic is approximately 80 percent one-to-one transactions and 20 percent one-to-public transactions. The majority of VANs would like the Federal government to pay for one-to-one transactions.
- Network architecture for EC. VANs prefer the virtual network solution. Virtual networks allow connectivity via multiple device types, protocols, and line speeds, protecting investment in existing equipment. The architecture should include direct government-TP connections. The VAN industry prefers all government public transactions be stored in one location. There should be standard implementation conventions, standard protocols, and standard transaction sets. VANs should be allowed to transmit ASC X12 over E-mail. They said inter-VAN security is needed and the Public Key infrastructure could be used.
- Value-added services. The VANs are ready and eager to do business with the Federal government. They will help market EC to small businesses and provide implementation assistance to government trading partners.

RECOMMENDATIONS

We recommend that the ECAT follow the DoD model and request VAN services at no cost for the first year of operation. A no-cost arrangement for the first year enables the government to obtain VAN services more quickly than would be possible with a competitive procurement, ensuring a September 1994 initial implementation date. Based on DoD's experience and ECAT interactions with VAN providers, we believe that the VANs are willing to explore this option for the first year while the government implements the system.

We recommend that, for the first year, we use DoD's process for the VAN recruitment effort. The effort will include advertising in the CBD and providing *Technical Requirements for EDI VAN Providers* to all interested parties. All VANs interested in participating in the Federal EC system will be required to successfully demonstrate technical capability by participating in a formal test managed by DoD. After successful testing, DoD will issue the *Certification Agreement for EDI VAN Services* to the VAN provider. VANs that fail the initial test will be given the option of requesting another test.

We recommend that, after the first year of operation, the no-cost option be reevaluated. This re-evaluation should include a thorough analysis of actual cost data to determine if the government should begin paying directly for selected VAN services and if VANs should pay for exclusive rights to government RFQs. If the government decides to pay for VAN services in the future, it will have to set up a tracking and billing system to bill the various government agencies for their VAN traffic. This will have to be done at the NEP where the VAN interfaces with the government.

IMPLEMENTATION CONVENTIONS

ELECTRONIC DATA INTERCHANGE

The definition of electronic data interchange approved by the International Data Exchange Association encapsulates all EDI key elements. It defines EDI as "... the transfer of structured data, using agreed-upon message standards, from one computer system to another, by electronic means."

That definition stresses that data ready for exchange must be in a processable form rather than in an unstructured free text form. The use of agreed-upon message standards implies that interchange partners have agreed on a standard way of formatting the data for electronic exchange. Failure to reach such an agreement would mean incoming data would be unintelligible to the receiving system. Exchanging data from one computer system to another implies that those systems are in different organizations. Finally, exchanging data by electronic means implies the use of communications technology for transfer.

In the trading environment, a convenient phrase often used to describe EDI is "paperless trade." That phrase may oversimplify EDI. Certainly, EDI is a means of reducing or eliminating the mountain of paper documents that go hand-in-hand with traditional transactions. The phrase does, however, disguises one extremely important element of EDI: the data being exchanged between one system and another must be in a processable form. In other words, data being received must be capable of being processed directly by the receiving system without the need for human intervention.

THE EDI STANDARDS

Federal Information Processing Standards Publication 161-1

FIPS Pub 161-1 adopts two families of EDI information syntax standards: American National Standards Institute (ANSI) Accredited Standards Committee (ASC) X12 and United Nations Electronic Data Interchange For Administration, Commerce and Transport (EDIFACT). FIPS Pub 161-1 requires the use of ASC X12 or EDIFACT, subject to certain conditions, when departments or agencies implement EDI systems. The choice of which family of standards to use is normally a matter for agreement between trading partners.

ASC X12

Numerous industry-specific syntax standards for the electronic exchange of business information exist. North America has generally recognized ASC X12 as its standard. Many Pacific Rim nations also support it. Most industry-specific standards have committed to aligning themselves with ASC X12. Federal agencies using industry-specific standards on September 30, 1991, may continue to do so for 5 years from that date. Industry-specific standards are usable beyond September 30, 1995, only if ASC X12 (or EDIFACT) does not approve equivalent standards.

ASC X12 consists of a number of underlying standards and addresses a wide range of business requirements. Since most EDI information exchanges are domestic and ASC X12 is more widely used than EDIFACT, X12 is currently the preferred EDI syntax. A number of functionally oriented subcommittees manage ASC X12. A close working relationship between individual agencies and these subcommittees has evolved, and it is in the government's best interest to maintain these relationships. Federal participation in ASC X12 subcommittees generally comes from a wide range of functional users. There is, however, no central coordination mechanism to ensure that their positions are in keeping with any federal EC strategy, or to assure that federal agencies are supporting the same position.

EDIFACT

EDIFACT is being developed by the United Nations Economic Commission for Europe - Working Party (Four) on Facilitation of International Trade Procedures (UN/ECE/WP4). As the name suggests, its genesis was in Europe, but its acceptance as the single international EDI syntax standard has become evident. In some agencies such as United States Customs Service, EDIFACT is already the preferred syntax for certain business actions. Regional EDIFACT Boards manage EDIFACT. The United States comes under the Pan-American EDIFACT Board (PAEB), which is the coordinating body of the national EDI standards organizations of the American continents.

ASC X12 is the U.S. national EDI standards organization and therefore will be the point of entry for the EC initiative. Since the industry base predominantly uses X12, this will be the initial syntax used for the acquisition function. While EDIFACT is very similar to ASC X12 in both purpose and approach, sufficient technical differences exist which may inhibit interoperability between implementations of the two standards. As EDIFACT use expands, the EC initiative will require implementation of both standards. This situation will require a migration strategy from the national standard (ASC X12) to the international standard (EDIFACT).

Fortunately, emerging awareness of commerce's international nature and the desirability of a single international EDI syntax standard has resulted in a decision by the ASC X12 committee to begin to align its standard with EDIFACT by 1997. Although the implementation plan is not final, it appears that sometime after 1997, new standards follow EDIFACT syntax. Therefore, a straightforward, cost-effective, and low risk migration strategy is possible. As ASC X12 migrates to EDIFACT compliant standards, the EC initiative will adopt each new EDIFACT compliant standard as it becomes available from ASC X12. The Federal migration will be market-driven, in that the Government will migrate as the industry migrates.

If the ASC X12 alignment with EDIFACT goes more slowly than anticipated, continued adherence to the well-established ASC X12 standard will protect the domestic supplier base. If it goes more quickly than expected, the entire ASC X12 community will migrate with little danger that the government might get too far ahead of its supplier base. The government will adopt an EDIFACT version directly only if a specific international need not addressed by ASC X12 emerges. This approach will also minimize the demand for participation in external syntax standardization bodies.

For the time being, participation in ASC X12 will remain the primary method of influencing the standards community to meet EC needs. However, the importance of preparation for the eventual migration to EDIFACT cannot be overemphasized. EDIFACT transaction sets, called messages, must be reviewed for federal business functionality. The government should submit modifications to cover current gaps and submit new data maintenance to both standards to ensure future functionality. Controlled standards adoption requires stringent configuration management and coordination between federal agencies and their trading partners.

X.400

X.400 is the Open System Interconnection (OSI) international standard for electronic mail. The standard exists in three versions: 1984, 1988 and 1992. Implementations of the 1984 version provide services to send and receive interpersonal messages. That version provides a basic transfer system for the storing and forwarding of messages. Implementations of the 1988 version added a variety of enhanced services to the basic message transfer system (i.e., security and remote message storage). Implementations of the 1992 version expand the types of messages that may be

transferred. This expansion includes store and forward communications services for the open-system environment transmission of EC transactions. A subset of the overall X.400 recommendations, designated X.435, contains the services provided specifically for EC.

X.500

X.500, the OSI international standard for directory services, has two versions: 1988 and 1992. Implementations of the 1988 version provide services to store and retrieve directory information. Implementations of the 1992 version add access control and replication of distributed data services. X.500 directory services must be available to X.400 users to provide electronic mail-addressing information, including EC trading partner and VAN address information. The distributed data services may become particularly useful as EC implementations mature.

STANDARDS FOR EDI IMPLEMENTATION

EDI syntax standards, both ASC X12 and EDIFACT, accommodate a full range of business activities for all industries. A standard is the result of a consensus among a large number of users, each with its own set of needs. It is a superset intended to meet the diverse requirements of all users. Standards commonly contain more data elements and structure options than any one user or industry needs. They often contain a multitude of optional ways to convey the same information. Their value is to provide the general rules and structure to allow general-purpose implementations to “get in the right ballpark.”

Being in the “right ball park” is not good enough to conduct business by EDI. Far too many opportunities exist for inefficient, incomplete, or ambiguous transactions. Therefore, actual EDI business processes require implementation conventions (ICs) to fully define transactions. ICs do that by tailoring the use of the standards’ segments, data elements, and code values and providing a subset menu of those distinct parts. In addition, ICs document the intended interpretation of a standard.

For example, different subsets or data combinations within the ASC X12 invoice (810) transaction set can transmit a commercial invoice, a progress payment, or a public voucher. ICs resolve interpretative differences to determine which segments and data to use in each context. This process, called standards profiling by the standards community, refines standards for use in a particular context. Appendix H provides more detail on standards profiles.

The pyramid in Figure 3-6 depicts the progression from the universe of needs to actual transaction set usage. The broad base covers all business requirements. Industry structured and organized these requirements into common standards under X12. Implementation conventions tailor the application and use of these standards in order to

address the business needs within a specific context (such as government acquisition). Translators then use the ICs to define specifications for specific implementations (application systems).

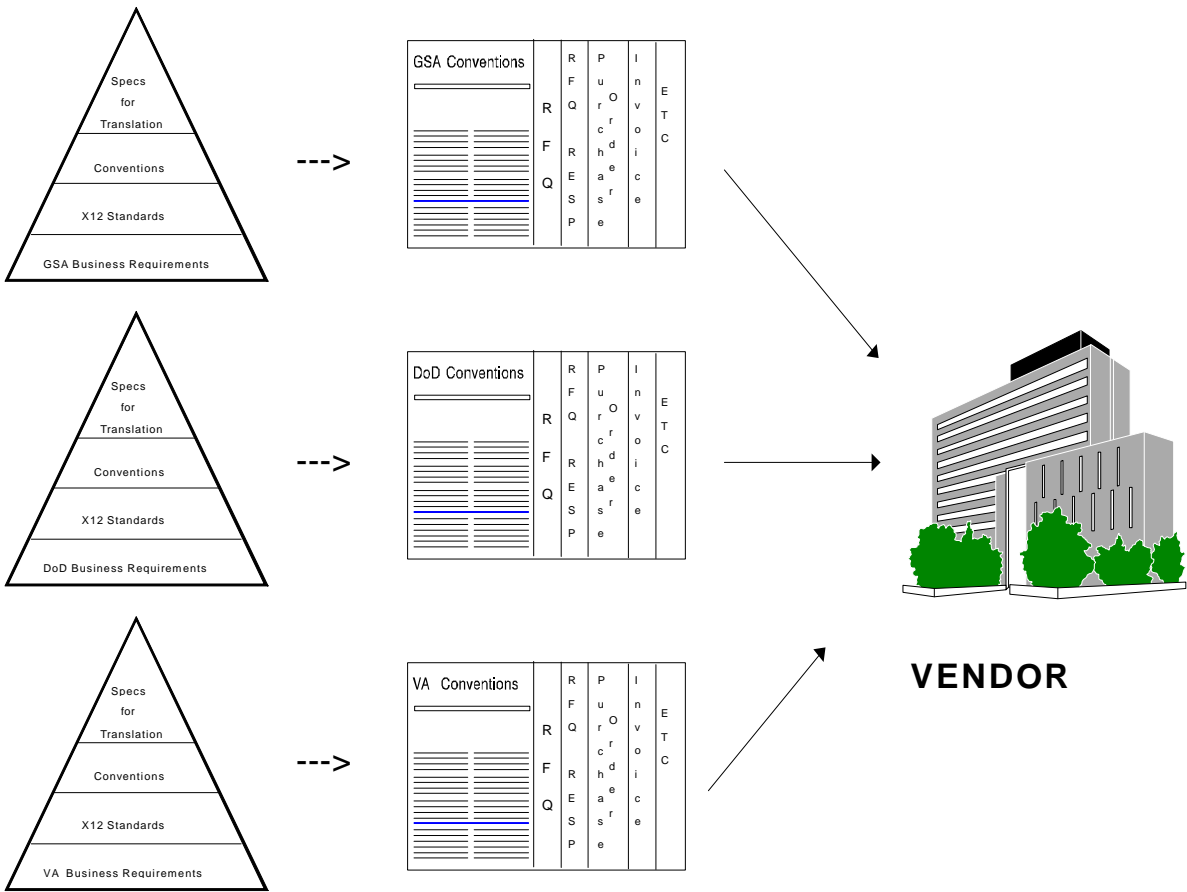


Figure 3-6. Current: Vendors Deal With Many Conventions

As Federal agencies begin to establish various ICs in support of acquisition and payment EDI processes, they present a multitude of requirements to the vendor community (see Figure 3-6). If the government is to present a “single face to industry,” it is imperative that agencies coordinate their business data requirements and establish standard ICs (see Figure 3-7). Establishment of standard ICs becomes more crucial given the fact that the business community already supports multiple EDI syntax standards and releases. Standardization creates efficiency; uniqueness increases costs. If trading partners must react differently to each agency’s transactions, they will charge that additional cost back to the government.

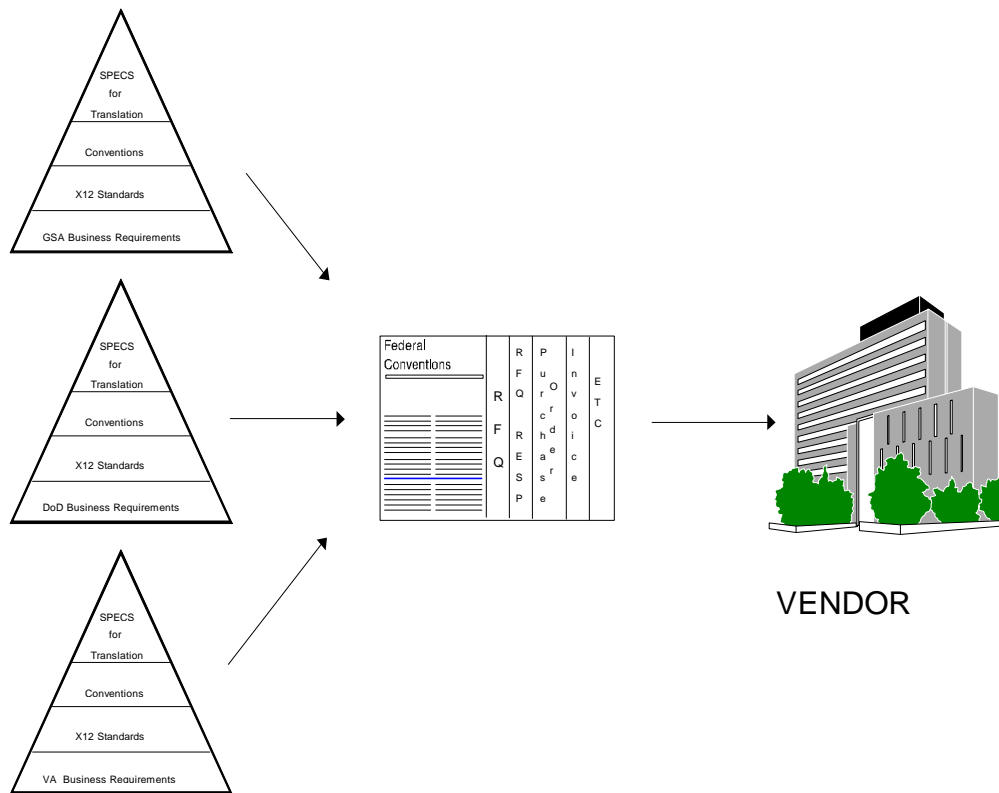


Figure 3-7. Future: Single Face to Industry

EDI Business Flow

EDI transactions can only be effective if government acquisition software and supplier software are interoperable. For example, suppliers' systems must recognize and respond to all elements in a Request For Quotation (RFQ), and government systems must recognize and process all elements in the response to the RFQ, or quotation.

Table 3-4 shows a possible message flow in a successful EDI transaction. The flow involves many different entities: the initiating agency, the successful offeror, and potentially a large number of unsuccessful offerors. All potential offerors must be able to process the agency's RFQ, the agency must be able to process responses from every offeror, and the agency and the successful offeror must be able to exchange purchase and payment information.

Table 3-4. POSSIBLE MESSAGE FLOW IN SUCCESSFUL EDI TRANSACTION

Transaction Set	Government Initiated Transaction	Supplier Initiated Transaction
838		Vendor Registration
838	Vendor Registration Confirmation	
840	RFQ	
997		Functional Acknowledgment (Ack)
843		Response to RFQ

997	Functional Ack	
850	Purchase Order	
997		Functional Ack
855		PO Ack (optional)
997	Functional Ack(optional)	
860	PO Change Request (as required)	
997		Functional Ack (as required)
865		PO Change Ack (optional)
997	Functional Ack(optional)	
810		Invoice
997	Functional Ack(optional)	
820	Payment Order/Remittance Advice	
997		Functional Ack

Initial Implementation Conventions Development

General

The scope of the ECAT currently includes only the information standards (data and syntax) that support Federal small purchases. However, EC is becoming a standard business practice throughout the government, and the plan outlined in this report will form the foundation for all Federal sector EC IC management. It provides the mechanism for the development, adoption, publication, and configuration management of EC ICs in support of Federal acquisition systems. Its principles will support all Federal business systems.

Initial Process

The development of ICs for the targeted X12 transaction sets relies on such information sources as current EDI implementations within the government, analysis of the ECAT's agency survey responses, coordination among agencies, and coordination with industry. Current plans call for the development of the required ICs using the X12 version release 3040 as the most current version. It will be upgraded to release version 3050 to allow for large and complex procurements. Any requirements missing from that version should be checked against the Department of Defense's pending data maintenance actions before any new maintenance is submitted to the X12 committee. While recognizing that version 3050 will incorporate many of these maintenance actions, the agencies will need initial conventions before September 1994 in order to begin implementation. The ICs will continually evolve, and future versions can incorporate these requirements as they are issued. For ease in presentation, ECAT ICs will utilize a standard convention format.

Agency ICs for acquisition transactions are currently available from DoD, GSA, and VA. All three agencies use the Purchase Order transaction set (850), with some implementations of the RFQ transaction set (840) and Invoice transaction set (810). Analyzing these existing ICs will establish a business requirement baseline for each

transaction set. The analysis will identify common business elements and record differences.

The original ECAT agency survey of data requirements requested a focus on external (vendor) business requirements not internal (agency) business requirements. Responses provided a list of elements needed by or from the vendor. Maintaining this focus should minimize unnecessary data transmission, thereby encouraging process reengineering within the agencies. Until agency application systems are modified, they may continue to transmit or request extraneous internal data. As much as possible, agencies must minimize these occurrences.

The survey data base tabulated agency requirements and mapped them to X12 segments, data elements, and code values. For each transaction, any differences requiring clarification or resolution went back through the agencies to synthesize the requirements, as much as possible, into a single convention. When certain elements have limited applicability for either specified agencies, commodities, or special conditions, use of implementation notes can prevent creation of multiple conventions.

After consolidating the functional business requirements from the survey, the ECAT IC subgroup will canvass industry. The government must consult its trading partners, and other users such as VANs and software providers to validate the ICs. Several major industry groups already have defined ICs. The IC team will solicit these groups for comments on the draft ICs and will also solicit comments from the X12 subcommittees. A *Commerce Business Daily* notice solicited additional comments from the business community using EDI but not members of ASC X12. While industry concurrence with the ICs is not required, industry input and assistance will ensure that the government does not create undue hardship in the private sector. In the final analysis, however, these ICs will become the “rules” for government procurements done by EDI.

The final conventions will require the approval of each agency to indicate their commitment and agreement.

Management Plan

General

A management plan is necessary to lead, integrate, and coordinate development and maintenance of ICs over the long term. A management plan will improve effectiveness and efficiency and reduce costs by applying uniform standards. The objectives are to

- develop and integrate overall Federal standardization of ICs;
- focus on reducing costs and improving efficiency;

- streamline and structure the process to achieve consistency, visibility, and control and thereby hasten the availability of standards and reduce costs;
- establish and provide access to a single government focal point for EC ICs;
- develop and implement management policies, roles, responsibilities, and procedures;
- provide the EC user community with an effective configuration management policy and with appropriate implementing procedures;
- manage government participation in the standards development process; and
- coordinate EC efforts with other standards efforts within the Federal sector.

Roles and Responsibilities

The Department of Commerce has overall authority to establish standards and guidelines for the Federal government. Successful implementation of Federal EC also requires functional (program office) participation since these standards affect processing among Federal systems and between Federal and commercial systems. Figure 3-8 shows how the functional areas (procurement, finance, information resources management) would collect the acquisition requirements internally within each department and then funnel them to an interagency working group similar to the ECAT.

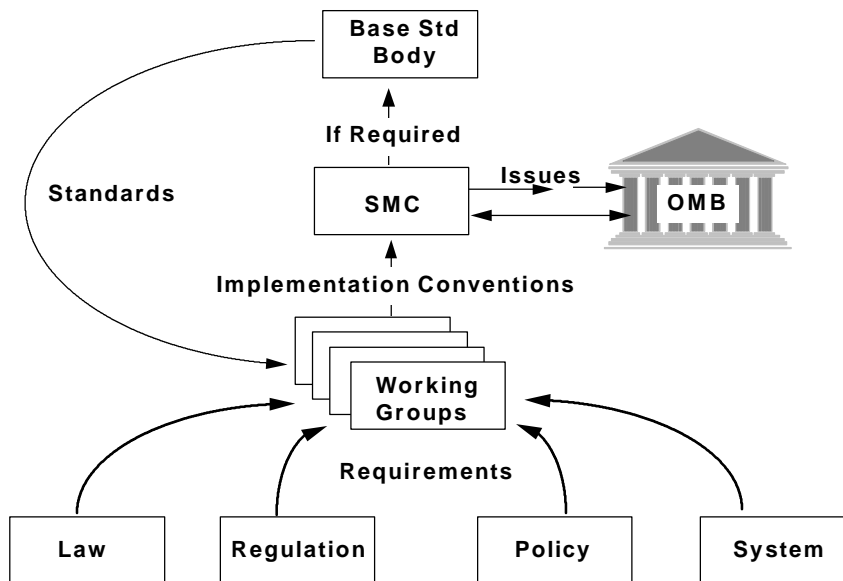


Figure 3-8. Acquisition Requirements Collection Process

The structure proposed in Figure 3-9 places action at the interagency working group level, integrating the functional and technical elements involved in ICs. The responsibilities of the various elements of the EC standards management structure are described in the following sections.

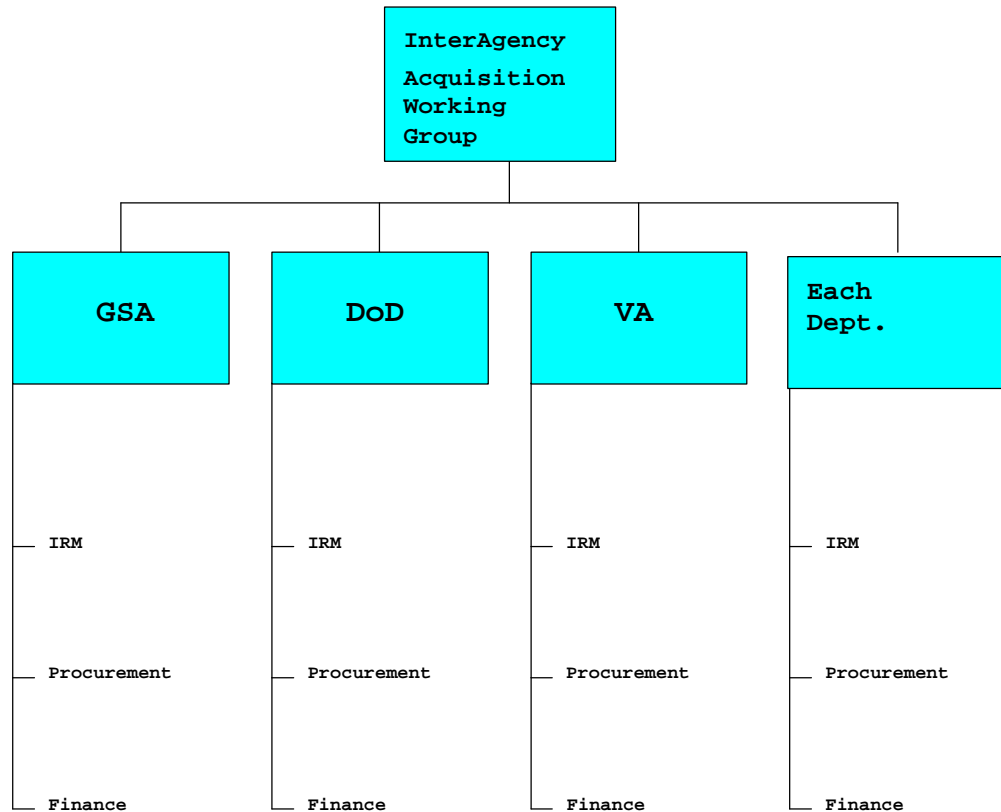


Figure 3-9. PROPOSED STANDARDS MANAGEMENT STRUCTURE

Office of Management and Budget (OMB)

The OMB will have overall responsibility for implementing the management plan and charting interagency groups created under its provisions. It will be responsible for the following actions:

- Providing overall fiscal and policy guidance to the agencies in developing their EC programs.
- Ensuring that EC programs are in conformance with OMB circulars A-119 and A-130.
- Sponsoring and charting appropriate interagency coordination efforts.

National Institute of Standards and Technology (NIST)

The NIST will perform the duties of configuration manager and administrator, or Technical Secretariat. It will be responsible for the following actions:

- Coordinating and integrating the government's EC activities, including configuration management
- Ensuring that Federal agencies as well as commercial business and industry groups participate in EC standards management activities and face-to-face meetings
- Assessing the completeness of standards products referred to the SMC
- Administering the process that prioritizes projects, defines requirements, and assures requirement compliance
- Providing the use of NIST's Registry of Federal Conventions, Transaction Set Convention Editing Tool, and Transaction Set Development System to facilitate development, prototyping, documentation and dissemination of ICs.

Electronic Commerce/Electronic Data Interchange Standards Management Committee (SMC)

This interagency committee will be the decision-making body for government EC and will perform most of the standards management activities. Initially, this group implements the ECAT IC recommendations; therefore, the focus will be placed on acquisition. When the government's EDI efforts move into other functional areas, the SMC will take on a cross-functional management role. Its membership will expand to a wide range of functional communities. The committee has the following responsibilities:

- Coordinating and integrating all EC IC actions
- Developing Federal EC ICs and maintaining control of approved ICs
- Ensuring that EC standards developed under its direction are in accordance with appropriate Federal standards development guidance and meet users' functional and technical needs
- Receiving and reviewing proposals for EC standardization from interested members or parties sponsored by a member
- Recommending and supporting the establishment of standardization projects in standardization areas related to EC, based on established criteria
- Soliciting, recommending, and endorsing nominations of Federal representatives to external groups and provide guidance and support to ensure user requirements are satisfied
- Assisting agencies in presenting to standards bodies the EC requirements necessary to meet their functional needs
- Facilitating agreement among Federal agencies
- Forwarding unresolved issues to the OMB for resolution
- Establishing working groups to address specific EC-related issues and activities

- Coordinating with industry.

Interagency Working Groups

Interagency working groups will operate under the EC SMC to identify functional user requirements and propose solutions. Because of ECAT's focus on Federal acquisition, an interagency Acquisition Working Group will be the first established. However, EC is quickly becoming a standard method for conducting a wide range of business activities. Therefore, other functional working groups (for example, Finance and Accounting, Transportation,) will soon be required. An interagency working group will be responsible for the following actions:

- Coordinating and integrating EC standards actions within its functional area
- Developing Federal EC ICs applicable to the functional area
- Ensuring that EC standards developed under its direction are in accordance with appropriate Federal standards development guidance and meet users' functional and technical needs
- Receiving and reviewing proposals for EC standardization from interested members or parties sponsored by a member
- Recommending and supporting the establishment of standardization projects in standardization areas related to EC, based on established criteria
- Recommending nominations of Federal representatives to external groups and provide guidance and support to ensure user requirements are satisfied
- Assisting agencies in presenting to standards bodies the EC requirements necessary to meet their functional needs
- Facilitating agreement among Federal agencies
- Forwarding unresolved issues to the SMC for resolution.

Departments and Agencies

Federal departments and agencies must create internal groups to identify needs for new ICs or changes to ICs based on legal, policy, procedural, or systems requirements. These internal groups are the sources of actions carried to the interagency working groups. If necessary, they may develop agency-level ICs that are narrower than the government ICs; however, they may not develop agency ICs that are broader in scope. An agency IC may specify that only a subset of the Federal IC will be generated in outbound transactions but agencies must accommodate any inbound transactions that meets the Federal IC.

Long-Term Strategy

The EC standards management structure shown in Figure 3-9 represents ongoing efforts to develop EC standards. Centralized coordination of the process reduces the resources required to support EC activities. This management plan recommends the following long-term strategies:

- Use voluntary industry standards (X12 and EDIFACT) as the base standards.
- Minimize development of agency- or government-unique requirements.
- Consolidate any Federal programs that are working on standards maintenance and development and that satisfy similar requirements.
- Identify and eliminate duplication with commercial standards.
- Participate in voluntary industry standards groups as appropriate.
- Develop and coordinate the Federal EC positions presented to voluntary industry standards groups.
- Provide a focal point for support when an area of technical interest includes several voluntary industry standards activities.
- Coordinate requirements, projects and progress to promote the following:
 - A unified Federal position on EC
 - Consistent interpretation, implementation, and application of EC-related information technology standards
 - Identification of areas of mutual interest for possible collaboration.

The following processes are key to achieving the goals:

- An open process (including government and industry trading partners) for developing and promoting widespread use of conventions.
- A controlled process for distributing particular versions of the conventions, and directing when to change to the next implemented version.
- A process (possibly government controlled) for testing and making known EDI implementations relating to each version of the conventions. (An EDI process architecture defines the relationships between transaction sets.)
- Mandating that all agencies and their trading partners move to a particular version of a standard on a particular day is not realistic. Instead, a phased in migration has more likelihood of success. Some agencies already use some X12 versions and conventions. For them, migration to later versions can occur only in conjunction with migration by their trading partners. Many agencies and their trading partners are currently operating manual systems or partially automated systems. For them,

adoption of the latest version is possible, but they may have to be convinced of EC benefits.

As the government-wide ICs evolve, three implementation stages will occur:

- An early stage, during which many agencies and their trading partners will be using several (e.g., three or four) transaction set conventions. Each agency will undergo a period of stability during the evolution of the government-wide ICs. That period will be relatively short, and changes may occur on an annual basis.
- The second stage will occur at the mid point in implementation. At that time, agencies and their trading partners will be using several versions of one convention set (that is, some will use the 1996 version, some the 1997 version, etc.) Migration will continue toward the latest set of the interagency conventions.
- The third, or mature, stage of implementation exists when all agencies and their trading partners are using the same interagency IC version. A synchronized migration to a later version can occur in across all agencies and their trading partners. Changes in transaction set conventions should be infrequent and periods of stability should be correspondingly long.

CONFIGURATION MANAGEMENT

Objective

The primary objective of this EC plan is to provide an effective configuration management policy with appropriate management guidance for Federal EC standards. It includes specific policy guidance for configuration management. Functional working groups, formed under the SMC, will develop and maintain ICs. Each working group will have responsibility for specific ICs. It will coordinate recommended changes before referring them to the SMC. The SMC will provide final coordination of ICs, unless the final coordination process entails a policy issue. In that case, the SMC will resolve the issue within its membership if possible. OMB will resolve those policy issues not resolved by the SMC. Functional groups must resolve functional issues before submitting them to the SMC. If that is not possible, the SMC will coordinate a resolution within the functional area in dispute.

Configuration Management

Configuration management of ICs/standards has three primary functions:

- Control and processing of proposed changes to the ICs through submission of change proposals to the EC SMC configuration control board for approval.
- Status reporting through a listing of the latest version of the standard and all approved change proposals.

- Auditing of the ICs through testing to ensure that the standard and approved change proposals fulfill the functional requirement.

Configuration Management Methodology

Configuration management comprises the following steps that help establish, define, and document the process:

- Identification. The following steps are needed to place an IC under configuration management :
 - A functional working group or the SMC proposes the development of a new Federal IC or the modification of an existing one.
 - The SMC notifies NIST that it approves the proposal.
 - NIST assigns the project a positive control identifier such as a project number.
- Control. The configuration management control process follows these general rules:
 - Change proposals propose changes to ICs. NIST proposes and the SMC approves a standard format for change proposals.
 - Control change proposals identify the impact of proposed changes to standards on underlying base standards.
 - The SMC reviews and approves change proposals.
 - The SMC ensures approval of any required changes to underlying base standards by the appropriate standards body before setting an implementation date for any Federal IC changes.
 - Documentation is maintained on any action affecting EC standards, using proper management controls.
- Status reporting. Configuration status reporting will provide a record of changes to IC documentation. Current status will be maintained on all EC standards documents, including, but not limited to, those under configuration management. Version control and IC effective dates are the responsibility of the SMC.
- Auditing. Verification of EC standard conformance: Annual configuration management audits will verify EC standard conformance. These audits will verify and document that:
 - Each approved IC and its configuration identification agree, are complete and accurate, and satisfy configuration management requirements.
 - Each approved IC conforms with its associated underlying base standard.
- Configuration management baselines. Baselines will ensure an orderly transition from one major decision point to the next. Configuration records for each standard

will be established when the baseline is set. All configuration baselines will be identified and properly documented. A baseline and approved changes constitute the current approved configuration-managed standard. A valid and current configuration baseline of standards is necessary to maintain the integrity of system interfaces. EC standards provide technical definition for information system processes, procedures, practices, operations, services, interfaces, connectivity, interoperability, information formats, interchange, and transmission or transfer.

Implementation Procedures

General

The SMC is responsible for configuration control of the EC implementation convention standards. Configuration management of standards occurs in two distinct phases: development and maintenance. The development phase consists of identifying the service description or functional requirements the standard is to fulfill, developing a prototype, testing the prototype to ensure that it meets the requirements, and gaining consensus and ratification of the standard or IC. The maintenance phase consists of identifying changes to the approved standard or IC resulting from errors in development, changes in requirements, or technological changes.

Development Phase

The configuration management process during the development phase is less formal than that during the maintenance phase to allow the development process to proceed without unnecessary delays. In the development phase, standards products consist of technical reports and positions developed for submission to external activities and informal draft documents. The SMC performs configuration control, coordination, and approval of technical reports and positions unless an issue resolution problem arises. The SMC sends draft standards documents to all interested parties for informal department and agency coordination in accordance with this plan's provisions.

Following resolution of significant comments from informal coordination and with appropriate approval, the SMC will distribute the final draft document to each representative for formal coordination. After resolution of all significant comments, the approved document will enter the maintenance phase.

Maintenance Phase

In the maintenance phase, changes to approved ICs result from errors, changes in technology, or changes in requirements. Three classes of priority exist:

- Emergency (E). Assign an emergency priority to a change proposal for one of the following reasons:

- To effect a change that, if not made expeditiously, may seriously compromise the mission effectiveness of deployed equipment, software, or personnel.
- To correct a hazardous or potentially hazardous condition whose existence could result in injury to personnel or damage to equipment.
- Urgent (U). Assign an urgent priority to a change proposal for one of the following reasons:
 - To meet significant contractual requirements (e.g., when lead time will necessitate slipping approved production or deployment schedules if the change were not incorporated).
 - To make an interface change which, if delayed, would cause a schedule slippage to a program or project or increase its cost.
 - To realize a significant net life-cycle cost saving to the government, as defined in the contract, through value engineering or through other cost reduction efforts. A major factor in realizing lower costs is the expedited processing of the change.
 - To correct unusable output critical to mission success.
 - To change operational characteristics in order to implement a new, more stringent completion date for a regulatory requirement imposed by an authority higher than that of the functional proponent.
- Routine (R). Assign a routine priority to a proposed change when “urgent” is not applicable.

Responsibilities

Once the maintenance phase commences, responsibility for the IC passes to the SMC. However, changes to individual ICs will be made by each working group for those ICs for which it is responsible.

Any agency may appoint a representative to any functional working group. Each agency with an active participation in any working group may appoint a representative to the SMC. Any voting member (including the chairperson) may nonconcur in the decision of any group and declare that the decision is a substantive issue. The SMC receives substantive issues from the working groups for resolution. The SMC forwards substantive issue appeals to the OMB for action.

The Federal delegate to the appropriate standards body receives recommendations that require nongovernment IC's coordination. Within 30 days of the end of each voluntary industry standards body's meeting, the Federal delegate to each forum will report the status of change proposals in coordination.

Configuration Management Change Proposal Process

EC SMC is responsible for managing and controlling EC ICs under its purview. The SMC will establish procedures, milestones, terms of reference, formats, etc. The change proposal process is a multi-step process consisting of submission, review, analysis, testing, evaluation, decision, approval, and incorporation into the baseline. Change proposals will conform to configuration management guidance established by the SMC. Each change proposal will be checked for completeness, clarity, and consistency, corrected in coordination with the initiator, and distributed to all interested parties. The change proposal will be analyzed and evaluated to assess its impact upon underlying base EC standards and will be evaluated for its impact upon implementations. The change proposal also will be evaluated to determine whether testing and evaluation is required

Documentation of Changes

NIST will ensure those change notices and/or revisions are available to all holders of IC documents changed by approved change proposals.

REMAINING ISSUES

Distribution

The actual distribution of the ICs is an issue itself. The following questions need to be resolved:

- Should ICs be distributed to vendors at no cost as a service and to get more vendors to use EDI quicker?
- Should vendors be charged to recover costs, in accordance with OMB Circular A-130?
- Should ICs be available on paper, on a bulletin board, in other electronic form, or all those forms?
- Should the government publish the ICs, or should publication be contracted out?
- Should the individual agencies distribute the ICs through outreach programs, through the National Technical Information Service (NTIS), or by a contractor?

Federal Acquisition Regulation

Until recently, FAR language promoted or required a paper environment to complete many procurement transactions. Numerous references require written notifications, copies, and contracting officer signatures. For example, written notice and signatures were generally necessary to terminate a contract.

The FAR Council established an initiative to facilitate EC practices in the procurement environment. FAR Case 91-104, recently published for public comment, intends to eliminate immediate barriers to the use of EDI. Current FAR Council committee efforts seek to fine tune that effort. Efforts include the removal of obvious impediments to EDI and revising FAR language to encourage EDI and other forms of EC.

The proposed FAR revisions include EC, electronic data transmission and storage, as an accepted way of doing business, no different from mail, telephones, or telegraph usage. Specific references to EDI or ICs often limit rather than encourage multiple EC initiatives. Additionally, not all procurement actions lend themselves to EC formats because of their complexity or frequency. Therefore, the FAR will permit but not require EDI transactions.

As its electronic environment evolves, the government must tell its trading partners how it intends to do business. Although often described conceptually as an effortless, electronic link between the government and its trading partners, realistically these systems are seldom totally transparent to the users at either end of the procurement process. However, procurement regulations should not manage the definitions of communication systems and ICs used to conduct the procurement process. These proposed revisions do not suggest that ICs be included in the FAR. The continuous evolution of EDI in general, and the volume of anticipated short-term revisions to the Federal ICs, would make maintaining a current set of ICs in the FAR extremely difficult. Citing the existence of the ICs and merely stating that they are mandatory when using EDI in government acquisition may be helpful.

WORK PLAN

To ensure that an initial government-wide capability is in place by September 1994, requirements' coordination, negotiated resolution of differences, and resulting convention documentation must be on an accelerated path. These conventions are crucial to the successful implementation and the "single face to industry." To ensure efficiency and effectiveness, the government will have to support maximum coordination of IC development with industry. The major steps required to facilitate this process and recommended time frames are shown in Table 3-5.

Table 3-5. Major Steps in Coordinating IC Development

ANNOUNCE THE IMPLEMENTATION CONVENTION DEVELOPMENT PROCESS AT X12 TRIMESTER MEETING IN FEBRUARY.
PUBLISH <i>CBD</i> ANNOUNCEMENT OF THE DEVELOPMENT PROCESS TO COLLECT NON-X12 FIRMS INTERESTED IN COMMENTING.
COMPARE EXISTING CONVENTIONS (GSA/FSS, VA, DOD, ETC.) AND IDENTIFY COMMONALTIES.
COLLECT BUSINESS REQUIREMENTS FROM AGENCIES
DEVELOP APPLICABLE ELEMENTS DATA BASE
SCREEN AGENCY SUBMISSIONS FOR INTERNAL REQUIREMENTS
CONTACT AGENCY CONTACT POINTS FOR CLARIFICATION AS NEEDED.
PREPARE "STRAW MAN" LISTING FROM RESPONSES AND EXISTING CONVENTIONS; DISTRIBUTE TO ORIGINAL SURVEY POINTS AND IC CONTACTS
REVIEW COMMENTS ON THE STRAW MAN; REVISE AS NECESSARY.
DISTRIBUTE DRAFT CONVENTIONS TO INDUSTRY AT THE JUNE X12 MEETING AND MAIL TO THOSE WHO SIGNED UP TO COMMENT VIA <i>CBD</i> ; IC AGENCY CONTACTS. USE BULLETIN BOARDS AS APPROPRIATE FOR MAXIMUM VISIBILITY
REVIEW COMMENTS; RESPOND AND MEET OR CALL AS NECESSARY. ONLY REDISTRIBUTE IF MAJOR CHANGES
OBTAIN DEPARTMENT (AGENCY) CONCURRENCE(S).
MAKE CONVENTIONS AVAILABLE BY AUGUST 31, 1994.

Early in the process, a data base assists in data evaluation and data manipulation into formats usable by functional and technical areas. That data base lists the business requirements for each transaction set, with the following attributes: level (summary or line item); format (date in YY/MM/DD, numeric, alpha, code, etc.); field length; agencies using; exceptions taken; conditions for use, X12 data element number and name; and X12 segment number and name that contains the element. The strawman prepared for agency comment would only show the level, format, length, maximum use, and conditions for use.

Throughout this chapter, we have presented a consistent theme of a "single face to industry." We have completed a discussion of how a trading partner registers with the Federal government using a single company identification code to identify trading partners for EDI and across agency application systems. We have also discussed the importance of VANs, standard government-wide X12 implementation conventions and Federal Information Processing Standards, and standard trading partner and VAN

agreements to support EC. The new ways of doing business we are proposing do not imply that the old ways were wrong. In their time, they were right; today there is a need to change the way we conduct business. The next chapter will focus on the technical architecture of the EDI network.